

# THE ZOOLOGIST

---

No. 751.—January, 1904.

---

## THE PLACE OF HERBERT SPENCER IN BIOLOGY.

By D. SHARP, M.A., M.B., F.R.S., &c.

THE 'System of Philosophy,' of which Herbert Spencer was the author, deals with Ethics, Psychology, and human Sociology, as well as with Biology. The pages of 'The Zoologist' are not the place in which to appraise the merits of his 'System' as applied to the more transcendental divisions of Philosophy. We shall here only deal with his claims as a Biologist; and we shall show that in the history of this science he will occupy a place between Lamarck and Charles Darwin—the men who, nobly aided by Wallace and Huxley, made it possible for their intelligent fellows to entertain a sure conviction that Biology is truly a Science, and that all its branches are legitimate subjects of inquiry, just as are the sciences of Astronomy and Chemistry. Previous to the exertions of the men we have named this was not admitted by the human Society.

It is now nearly one hundred years\* since Lamarck published his 'Philosophie Zoologique,' in which the idea of the permanence of specific distinctions was impugned, and an attempt was made to give philosophical reasons in justification of the opposed view of transformism.

Lamarck's effort was opposed by the great influence of Cuvier, and for half a century "permanence" was apparently nearly

\* Paris, A.D. 1809.

supreme amongst educated men, and was accepted—at any rate, nominally—by zoologists. Then in the middle of the nineteenth century came Spencer, Wallace, and Darwin, and the first of these in point of time was Spencer. Since the appearance of the works of these great men “transformism” or “evolution” has acquired a place in Philosophical Biology, from which it is certain it will never be deposed, however much views as to the actual nature of the transformism may differ.

At the present time the efforts of biologists are directed to discovering the mechanism by which transformation actually takes place. Herbert Spencer applied his idea of evolution (as a continued cosmic change that is constantly, if not uniformly, going on) to living creatures, including the structure and activities of man himself. His works have been largely studied all over the world, and have contributed greatly to the diffusion of the idea that plants, animals, and man are the results of natural laws, partly the same as, and partly comparable with, those that have modelled the features of inorganic nature.

I have said that Spencer was in point of time the first of the recent great transformist naturalists of the nineteenth century. We shall probably learn from his autobiography when he first conceived the idea of one set of natural laws governing all phenomena. But we can learn from his writings that in 1852 he was sympathetically disposed towards the “development hypothesis,” and that in 1854 he had a vague notion of Evolution as a general phenomenon. In 1854 he became intimately acquainted with Huxley, and thereafter his ideas underwent a rapid and great development; so that in 1857, in his *Essay on Transcendental Physiology*, we find a really adequate statement of his views on Organic Evolution. Here he tells us that the inheritance of acquired characters is possibly “the universal law; comprehending not simply those minor modifications which offspring inherit from recent ancestry, but comprehending also those larger modifications, distinctive of species, genus, order, class, which they inherit from antecedent races of organisms.” And, again, in the same essay:—“We might almost say that just as some original race of animals, which multiplies and spreads into different regions of the earth, becomes differentiated into several races through the adaptation of each to its conditions



of life; so, the originally homogeneous population of cells arising in a fertilized germ-cell becomes divided into several populations of cells that grow unlike in virtue of the unlikeness of their circumstances."

Thus, in 1857, Spencer clearly laid out his principles of Biology. In his subsequent great work on the subject he merely amplified, and considered from various points of view, the doctrine of this Essay on Transcendental Physiology.

Great misconception has prevailed as to the relations of the doctrines of Charles Darwin and Herbert Spencer. These we may deal with briefly. The first publication by Darwin and Wallace of the views that have made them so famous took place in 1858, a year after the appearance of Spencer's work. Hence Spencer could not have derived his ideas from them. Moreover, though the teachings of the two men—Spencer and Darwin—are constantly confounded, they have really little in common, except that both are endeavours to promulgate the truth of "transformism."

The first indication we find of Spencer being acquainted with Darwin's views is the note on p. 404 of the first edition of 'First Principles,' published in March, 1862. This note is of so much importance that we will quote it in full. It runs:—"Had this paragraph, first published in the 'Westminster Review' in 1857, been written after the appearance of Mr. Darwin's work on the 'Origin of Species,' it would doubtless have been otherwise expressed. Reference would have been made to the process of 'natural selection' as greatly facilitating the differentiations described. As it is, however, I prefer to let the passage stand in its original shape; partly because it seems to me that these successive changes of condition would produce divergent varieties or species, apart from the influence of 'natural selection' (though in less numerous ways, as well as less rapidly); and partly because I conceive that in the absence of these successive changes of condition 'natural selection' would effect comparatively little. Let me add that, though these positions are not enunciated in the 'Origin of Species,' yet a mutual friend gives me reason to think that Mr. Darwin would coincide in them; if, indeed, he did not consider them as tacitly implied in his work."

Here Spencer makes it tolerably clear that he attached but

little importance to Natural Selection—the leading idea of Darwin's earlier teaching. Later on he proposed to substitute for "Natural Selection" the term "Survival of the Fittest." Concerning this Spencer published another very important note; it is on p. 530 of vol. i. of the 1898 edition of the 'Principles of Biology,' and runs:—"It will be seen that the argument naturally leads up to this expression—Survival of the Fittest—which was here used for the first time. Two years later (July, 1866) Mr. A. R. Wallace wrote to Mr. Darwin, contending that it should be substituted for the expression 'Natural Selection.' Mr. Darwin demurred to this proposal. Among reasons for retaining his own expression, he said that I had myself, in many cases, preferred it—'continually using the words Natural Selection' ('Life and Letters,' &c., vol. iii. pp. 45-6). Mr. Darwin was quite right in his statement, but not right in the motive he attributed to me. My reason for frequently using the phrase 'Natural Selection' after the date at which the phrase 'Survival of the Fittest' was first used above was that disuse of Mr. Darwin's phrase would have seemed like an endeavour to keep out of sight my own indebtedness to him, and the indebtedness of the world at large. The implied feeling has led me ever since to use the expressions Natural Selection and Survival of the Fittest with something like equal frequency."

These facts are sufficient to emphasize the independence of the views of the two men. Spencer continued to be polite to Darwin; and the latter, in the historical sketch prefixed to the later editions of 'Natural Selection,' actually made Spencer's priority over himself appear greater than it really was by attributing the origin of Spencer's 'System' to 1852 instead of 1857.

Certainly the two terms were not worth fighting about. The two great French biologists, Le Dantec and Delage, have expressed their opinions of the terms very clearly. Delage says of Natural Selection, in his work 'L'Hérédité,' the analytical portions of which are of the highest merit, "Ici comme partout, la selection naturelle en ne laissant vivre que ce qui est apte à vivre donne l'illusion du providentiel." And Le Dantec adequately disposes of "Survival of the Fittest" by pointing out that, as we can define the "Fittest" in no other way than "the one that

survives," the term merely amounts to the indisputable truism of "the survival of the one that survives."

No controversy ever took place between Spencer and Darwin, each invariably preserving a courteous demeanour to the other. Spencer, indeed, was by many supposed to be a mere plagiarist from Darwin, and the misrepresentations that became current gave Spencer much annoyance. He, however, contented himself with the lucid and dignified vindication contained in the preface to the fourth edition of 'First Principles,' dated May, 1880, as regards which we need only say that it sets forth the facts we have already presented to the reader, having drawn them from a survey of the documents themselves.

We have already indicated that there existed, from their first inceptions, serious divergencies between the views of Darwin and Spencer. After Darwin's death these discrepancies were rapidly brought into prominence by means of the writings of Professor Auguste Weismann, of Breslau, and thus were established the two schools of thought that have since been known as "Neodarwinian" and "Neolamarckian," Weismann being the exponent of Neodarwinism, and Spencer the champion of Neolamarckism.

Weismann is a man of great learning in Zoology, a most wonderful observer, with a great power of exposition. When, therefore, about the time of the death of Darwin, he came before the public with a demonstration of the insufficiency of the evidence in favour of the transmission of "acquired characters," this caused some serious anxiety to Spencer; and when it was followed by other essays, extending the influence of "Natural Selection" to fields in which it had not been recognized by Darwin as operative, Spencer was thoroughly roused, and opposed Weismann in a series of articles that were written when he was seventy-three or more years of age. One of his articles was entitled "The Inadequacy of Natural Selection," and it was followed by one from Weismann, styled "The All-sufficiency of Natural Selection."

It is not possible for us to summarize this controversy so far as the statement of Weismann's views is concerned.\* It is

\* Those who may be desirous of following a critical summary of Weismann's views will find it in Delage's 'l'Hérité,' 2nd edit. Paris, 1903.

sufficient to say that he accompanied his critical views by a constructive theory that involved great difficulties, and that will certainly be abandoned.

The controversy between these two great men has been of considerable advantage; and though biologists are, many of them, still inclined to take one side or the other, yet on the whole they have profited, inasmuch as they have thoroughly realized the necessity of replacing theory and argument as to inheritance, by the observation of facts.

Enough has been said. The influence of Herbert Spencer on Biology has been great and good, and though his argumentations will many of them be sooner or later replaced by demonstrated facts, yet his position is, as we said at the outset, an historical one, between Lamarck and the modern school.

## NOTES ON THE BIRDS OF ANGLESEA.

By T. A. COWARD &amp; CHARLES OLDHAM.

IN the spring of 1903 we again visited Anglesea,\* working the whole of the coast-line between Pentraeth and Carmel Head, and spending several days inland in North-east and North Anglesea, besides paying flying visits to Penmon, Puffin Island, Malldraeth, and Newborough. During the whole of our visit, which extended from the middle of May until the end of the first week in June, we had the companionship of Mr. S. G. Cummings, to whose power of observation and intimate knowledge of bird-notes anything of interest in this paper is largely due. Mr. Cummings has kindly placed at our disposal his notes of previous visits to the island. Although the spring had been cold and backward, we were fortunate in having a spell of excellent weather during most of our visit; indeed, some of the days were unpleasantly hot.

North Anglesea differs greatly in character from the country lying to the east of a line drawn from Point Lynas to Llan-gefni; considerable plantations at Llys Dulas, Lligwy, Parciau, Tyn-y-gongl, and Pentraeth, together with the many limestone terraces, often clothed with dense thickets of hazel and thorn, give the eastern portion a character similar to that of the wooded Straits; but, with the exception of small clumps of shade-trees round the larger farms, North and North-east Anglesea is practically treeless. It supports, nevertheless, a rich and varied flora, save in such places as Parys Mountain, where the copper mines and works have desolated the neighbourhood from the naturalist's point of view.

Parys Mountain is one of the largest of the rocky outcrops or "mynyddau" so characteristic of the island. Three others rise to a considerable height above the surrounding country, and are dignified with the title of mountain—Garn, Llaneilian, and Bodafon. They are somewhat bare compared with many of the lesser eminences, though stunted ling and clumps of gorse

\* Cf. 'Zoologist,' 1902, p. 401.

relieve their stony slopes. The lower mynyddau, if we may use this name, are in late spring gorgeous with gorse ; this year the bloom was finer than usual, and in many places the rocky outcrops were arrayed in cloth of gold ; the air was heavy with the sickly scent of the flowers, the richness of colour was indescribable. Linnets and Stonechats abound amongst the gorse, and at night the churring of innumerable Nightjars proves how well suited to the habits of this diurnally quiescent bird are these rough uncultivated tracts. Where the Stonechat is so abundant one cannot but be struck with the variation in the size of the white wing-patch of the male bird. Song-Thrushes and Blackbirds are plentiful on the rough ground, as, indeed, they are everywhere else ; the Blackbird is one of the most abundant birds in Anglesea, being common alike on cliffs, mynyddau, cultivated land, and even on the bogs.

The broad flat valleys of the sluggish streams are frequently extensive tracts of bog, and though attempts have in all cases been made to drain them, they have so far defied the efforts of the reclaiming agriculturist. Between the deep straight-cut ditches, which intersect the swamps, are great beds of bog-myrtle, cotton-grass, stunted ling, and other marsh and moorland plants ; in the wettest spots, buckbean, marsh cinquefoil, butterwort, and sundews grow luxuriantly, while water-lilies and yellow iris flourish in the pools. In one bog we came across fine plants of *Osmunda regalis*, and in another a large patch of the rare marsh fern, *Aspidium thelypteris*.

Meadow-Pipits, Reed-Buntings, and Snipe are characteristic birds of the bogs. The llyns, or small lakes, which occur in many places, have, as a rule, bare stony banks, where Sandpipers are to be seen ; there are few streams suited to the habits of this species. The aptly named Afon Goch, which flows from Parys Mountain, were it undefiled, would be an ideal habitat for the Sandpiper ; we did, indeed, see one bird upon its banks, though it is difficult to understand what it could find to feed upon in the polluted water.

The limestone cliffs between Redwharf Bay and Lligwy were, towards the end of May, wonderfully rich in colour ; in places the upper slopes were sheeted with *Scilla verna*, so that the grass from a short distance seemed lost beneath a pale blue haze.

Elsewhere primroses, interspersed with the purple spikes of the early orchis, grew in profusion, their pale yellow in strong contrast with the golden glory of the gorse. The steep faces of the grey crags are the haunts of large numbers of Swifts, House-Martins, Starlings, Jackdaws, and House-Sparrows, the last two species being especially plentiful where ivy covers the rock. The Ringed Plover and Oystercatcher breed on the beaches in every little bay, several pairs inhabiting the wider stretches at Lligwy and the estuary of the Afon Goch.

On the rugged north coast—between Point Lynas and Carmel Head—the metamorphic rock is weathered into jagged cliffs and deep fissures; the outlying stacks and the great boulders and fragments of fallen cliff which lie between the tide-marks are evidence of the disintegration which has been going on for ages. There does not appear to be any breeding station of the Kittiwake, but the Herring-Gull breeds all along this coast, the largest colony being on the stupendous cliffs at Carmel Head. Amongst the Herring-Gulls on the Middle Mouse, where there is a large colony, we could see, from the cliffs of the mainland, an adult Lesser Black-backed Gull; we had noticed another two days previously on the beach at Cemllyn. We did not meet with the Great Black-backed Gull in the north of the island, but we saw a pair near Aber Menai, at the place where we noticed the bird in 1902.

Owing to contrary winds we were unable to visit the Tern colonies on the Skerries, a group of rocky islets only approachable in calm weather, but on May 23rd we found that the Common Terns had not laid on Ynys Moelfre, nor on Ynys Dulas, where in June of the previous year Mr. Cummings found them breeding in large numbers. On May 25th some seventy Common Terns were floating idly in a compact body on the calm sea off Benllech Bay; they were not fishing, and, while the majority simply rested on the water, a few individuals were splashing and washing themselves. Very different was the behaviour of some birds we saw the following day, near Point Lynas, harrying a shoal of fish. Guillemots and rolling Porpoises marked the position of the shoal, Kittiwakes flew backwards and forwards, dropping occasionally to swim on the water, while a hovering cloud of Terns hung in the air above, raining birds upon the

unfortunate fish. From our position on the cliff we could watch the impetuous headlong dive and splash of the Terns, and hear, across the water, the clamour of their harsh screams, with which were mingled the occasional loud clear call of *kitti-wa-ake* and the guttural cry of the Guillemots.

There are no suitable beaches for the Lesser Tern on the northern coast, but a few pairs frequent the shingle at Lligwy Bay, where we discovered several scratched nesting-holes, but no eggs had been laid up to the 5th of June.

A great pebble ridge—gay in early June with thrift, great white trusses of secale, and the yellow flowers of the horned poppy—extends across Cemllyn Bay, forming on the landward side a tidal llyn or lagoon, shallow and muddy—an ideal spot for Waders. On the pebble ridge—perhaps the only possible place on the north coast—Ringed Plovers nest; when the tide is out an extensive stretch of wet mud is left exposed in the lagoon, attracting Ducks, Waders, and Gulls. On June 7th, and again on the 10th, we saw seven Turnstones feeding on the mud; amongst the tangle—and, indeed, on the brown mud—the birds were inconspicuous, but when they ran up on to the shingle they disappeared entirely, so closely did their black, white, and chestnut coloration assimilate to the variegated pebbles. When in flight one of the Turnstones uttered a sweet trilling note—the love-song, uttered in anticipation of its arrival at its northern breeding-ground. We also met with four Turnstones in Dulas Bay, and on June 12th saw five on the wrack-covered rocks in Malldraeth Bay; the majority of these birds were in full summer dress.

Black-headed Gulls, a few Oystercatchers, and about twenty Mallards—the last birds being nearly all males—were swimming or wading in the shallow water of the lagoon on June 7th. The Mallards rose on our approach; we saw them twice later during the day on the sea off Carmel Head. A couple of Whimbrels and a few black-bellied Dunlins were also feeding on the ooze. The only other Dunlins which we met with were a few at Lligwy Bay on May 23rd, and a small party on the beach at Aber Menai on June 11th. We met with no parties of Whimbrels this year, though we noticed single birds at Cemllyn or elsewhere on three other occasions. We saw Curlews on the rocks at low water in several places, but never many together.

The Oystercatcher is abundant all round the coast, nesting on the cliffs and in the bays. Near Lligwy, on May 30th, we found a nest containing four incubated eggs ; as there was only one pair of birds in the bay it is probable that all four eggs were the produce of the female, which ran silently from the nest on our approach. The nest was a slight scraping in the shingle at the foot of the primrose-carpeted cliff : it was lined with beach-worn shells of *Pecten*, *Ostrea*, and *Fusus*. Oystercatchers and Lapwings are constantly warring with the Crows which nest along the northern cliffs ; we watched one Oystercatcher make a determined assault upon a passing Crow. The Carrion tried to avoid its vociferous assailant—the Oystercatcher kept up an incessant angry shriek, *pic, pic, pic, pic*—by rising above it, but the Wader followed until both were at a considerable height above the cliffs, and eventually drove the baffled Crow off the field. A Lapwing swooped repeatedly at a young Carrion which had not long left the nest, and we witnessed the assaults of Kestrels upon these feathered Ishmaelites on more than one occasion. Near Carmel Head a pair of Crows had a brood with them just able to fly ; a male Kestrel swooped at the old birds when they passed, and, striking one, bowled it over into the grass. Here the Crow stood for a few seconds, and then cleared off. The Kestrel then hovered, stooping again and again at some object in the grass, but never actually striking the ground. When we reached the spot we discovered a young Carrion-Crow crouching in the grass, and quaking with terror.

Most of the young Carrions had left the nest by the end of the first week in June. We met with birds inland in a few places, but their great stronghold is on the northern cliffs, where we saw many empty nests, and young birds strong on the wing. On one projecting rib of black rock we found a nest containing four fully-fledged young birds, which completely filled the wool-lined hollow ; this nest was within easy reach of the top of the cliff, though other nests we saw were placed on ledges on inaccessible crags. One nest, which still contained two young birds, and from which the other two had just flown, was within a few yards of a high road which passes near the cliffs. The top of the cliff in the neighbourhood of the nests was littered with the refuse left by the maurauding Crows—freshly cleaned

limpet-shells, fragments of crabs, and in one place sucked hens' eggs.

We saw no Ravens, though Mr. Cummings has seen them in former years, and showed us a nest beneath an overhanging rock on the cliff wherein he saw three fully-fledged young in mid-April, 1902. A little further on there was another empty nest, a huge structure of thick gorse-stems, placed on an inaccessible face of the cliff.

The Kestrels on the north coast, as a rule, make use of the old nests of the Crows. When seen from the top of the cliff the red eggs are very conspicuous in the big dark nests. We found a few Kestrels nesting on the limestone cliffs in the east, but the bird was most numerous along the northern seaboard.

The Merlin is common on the northern coast, nesting among the heather near the top of the cliffs; we found three nests in one morning in June, and failed to find the nest of a fourth pair of birds. The shrill *kik, kik, kik* of a male Merlin which was flying about the heather-clad slope caused us to search for the first nest. Presently we flushed the female, and found five newly-hatched young birds in a shallow depression beneath a tuft of ling right on the very edge of the cliff. The birds were not all of the same age, and the egg-shells of the youngest lay in the nest. The eyes of the older birds were half-opened, but the younger ones were still blind. When handled the largest of the five uttered a feeble reproduction of the fierce *kik, kik* of the adults. The second nest was in a similar situation, at a spot where Mr. Cummings saw eggs last year; it contained three rather older young birds and a chipped egg. Here again the little ones, whose pink skin showed through their white down, whispered *kik, kik* when handled. The remains of a plucked Greenfinch lay near this nest, and the little greyish beaks of the birds were stained with recent blood. The third nest—a similar depression beneath a clump of ling—was within a few feet of a well-trodden footpath close to Amlwch; the clamour of the male caused us to search for and discover this nest, which contained a single egg, as it had done in the cases where there were young birds. A Blackbird, partly denuded of its feathers, lay on the cliff-top near Point Lynas, where we saw another Merlin, but failed to find the nest.

On June 9th we visited an old-established nesting-place of the Peregrine Falcon in a bay near Porth Wen, but we neither saw the birds nor any traces of their slain victims on the cliffs. Three months previously (on March 19th) Mr. Cummings saw the falcon here, and last year saw eggs in the nest at this place. A fisherman at Bull Bay, who said that the birds had nested here as long as he could remember, told us that he believed they had been shot this year by a gamekeeper. The destruction of the few surviving Peregrines is deplorable, especially in a country where seafowl abound and little game is preserved. It is satisfactory, however, to know that the pair on the eastern coast, which we saw in 1902, were again at the same place, and that at least one other pair nest on the northern coast. At one spot on this coast a female flew out barking furiously, followed by a male Merlin, which stooped at her several times, chasing her across the water. She paid little attention to her small assailant, and returned to the cliff, only to repeat her excursions again and again. Whenever she returned to the cliff she took up her position on a commanding piece of rock, close to a small inlet, and continued her angry barking. When we reached this spot the male left the rocks, and both birds flew out over the sea and along the cliffs, the female being the more clamorous; she never left the neighbourhood of the nest, though the male disappeared for a time. The eyrie was in a niche half-way down a precipitous cliff, and on a ledge, surrounded with grass and *Asplenium marinum*, were three young birds, pink-skinned as peaches and with their quill-feathers just showing, lying prone, apart from one another. Now and then one of them would rear itself up and shuffle awkwardly on its tarsi for a few inches. Within ten feet of the nest three pairs of Jackdaws were feeding young in crevices in the cliff, unharmed by the Peregrines, although for about a quarter of a mile beyond the nest the top of the cliff was a perfect shambles; scattered feathers littered here and there showed where the Falcons had plucked their victims. Amongst the feathers we found the remains of two Arctic Terns, a Common Tern, two domestic Pigeons, a Stock-Dove, and a Cuckoo.

We sought in vain for the Chough. The *Bran-big-goch*, as the natives call the bird, is probably extinct on the north coast, although a Bull Bay fisherman showed Mr. Cummings an old

nest in a cave near the village last year. He admitted, however, that he had not seen any of the birds in the neighbourhood for some years. The lighthousemen at Point Lynas knew nothing of the Chough, but that the bird formerly nested on Puffin Island is proved by the egg in Professor Newton's collection, which was taken there by the late Lord Lilford on May 21st, 1853. The nest contained three eggs and one young bird. Willughby does not specially mention this species in Anglesea, but says that it is found "all along the west coast of Wales." The old warrener at Penmon, whose memory carries him back to the first half of the last century, remembers the Chough breeding at Dinmor, opposite Puffin Island.

We were not fortunate enough to come across any Rock-Doves, though Mr. Newstead and Mr. Cummings have both, independently, seen white-crouped Pigeons on the north coast, and it is highly probable that a few pairs breed there. The Stock-Dove is abundant both along the coast and on the limestone terraces inland. On the great bluff of old red sandstone which rises above the southern bank of the Dulas Estuary, Stock-Doves and Jackdaws nest in hundreds. The cliff stands somewhat back from the copper-stained mud-banks of the estuary ; its lower slopes and the *débris* at its foot are clothed with trees and thick undergrowth, where we heard many Chaffinches and Chiffchaffs singing. The crags above the trees, copper-red where the rock is visible, were, in May and June, clothed with ivy and great masses of crimson campion and yellow gorse ; flocks of noisy Daws wheeled round the top of the cliff, and Stock-Doves and Wood-Pigeons were incessantly passing to and fro.

On May 26th we saw a Sheld-Duck on the mud of Dulas Estuary, and the previous day one on the rocks near Benllech ; the bird is apparently rare on the north and north-east. While we were passing along the pebble ridge which half crosses the mouth of the Afon Goch, a Lapwing walked slowly away a few yards in front of us. At the time we were watching some Turnstones, and paid little attention to the behaviour of the Lapwing, which no doubt had young concealed amongst the refuse and scanty herbage on the top of the ridge. The bird many times jumped spasmodically, and then pitched forward on its head, waving its wings disjointedly, and struggling along the ground as

if it were badly hurt. A few minutes later we saw it lamely struggle down the ridge towards the channel of the stream, a gutter six yards wide. It entered the water and swam laboriously across, holding one wing elevated ; the bird appeared to be hopelessly crippled. Reaching the far bank, it walked slowly up the mud, every few yards repeating the epileptic leaps and falls, until, some yards away on the far side of the stream, it discontinued its, instinctively simulated disability, and rose on the wing.

Several pairs of Ringed Plovers nest on the pebble ridge at Dulas, and others on the beach at Lligwy, where we found fresh eggs on May 23rd, and again on June 1st. Between Lligwy and Dulas we caught a young bird in down ; it crouched on the sand when we walked towards it, but ran after being handled, fed a little, and then crouched again as we approached. It uttered the *pee-ip* of the old birds, but in a much lower key. When it ran it raised its unfeathered wings, if hard pressed, as if to assist it in its flight. There were five adult Ringed Plovers on the beach near it, and two—presumably the parents of this young bird—repelled the others whenever they approached the young one, running at them with lowered heads, wings outstretched, and tails deflected and expanded. Sometimes these two followed the other birds on the wing for a considerable distance, darting after them, turning and twisting in flight. We met with two or three pairs of Ringed Plovers at Llyn Geirian, but we could not make out if the species breeds on the shores of this inland lake.

Mistle-Thrushes, fairly plentiful in the district round Red-wharf Bay and inland, are, curiously enough, abundant in the treeless country near Carmel Head. The birds sometimes breed on the cliffs ; on June 7th we saw a nest within ten feet of the beach, beneath an overhanging lichen-covered rock, and Mr. Cummings pointed out another nest on the cliff-face near Bull Bay, which was occupied last year. The Blackbird, very plentiful on the gorse-covered slopes above the cliffs, also occasionally nests on the cliff itself ; near Cemmaes we found one nest with fully-fledged young only a few feet above high-water mark ; it was built in the grass among the rocks. We twice heard Song-Thrushes introduce the *feet-a-feet* of the Oystercatcher into their songs.

The Ring-Ouzel evidently passes the northern coast on migration ; one of the lighthousemen at Point Lynas told us that this spring he had seen in his garden "a Blackbird with a broad white mark on its breast." The bird, he said, was so tame, that he was induced to attempt to catch it. No doubt many migrants touch Anglesea on their way north in spring. Mr. Cummings saw Wheatears here on the 17th and 19th of March, and probably these early birds were passing further north. On April 19th, 1902, he saw a male Redstart at Hell's Mouth, and a Whinchat near Cemmaes on the following day. He has also seen White Wagtails in spring in two or three localities—on the west coast at Rhos Neigr and Ty Croes, and on the north at Bull Bay, where on April 17th, 1902, when in company with Mr. R. Newstead, he saw a party of six or eight birds.

The Wheatear is not common on the north-east coast, but we met with a few birds between Moelfre and Lligwy, and on May 23rd saw a small party on Bodafon Mountain. We did not see any between Moelfre and Redwharf Bay on May 25th, nor on the following day between Dulas and Point Lynas ; perhaps the species had suffered from the cold spring, for there were certainly not so many at Penmon as there were in 1902. Between Cemlyn and Carmel Head, however, the birds were plentiful in the first week in June, being in the greatest numbers on Carmel Head, and in the rough country behind. By the 12th of June many of the Wheatears on Newborough Warren had young on the wing.

When walking between Redwharf Bay and Moelfre on May 25th we only saw a single Rock-Pipit, but there were a few about the Moelfre rocks, and on Ynys Moelfre. North of Moelfre we met with a bird here and there along the coast, but from Point Lynas westward the species is more abundant.

We kept a sharp look-out for the Red-backed Shrike, but only met with a single pair—at Porth-y-gwichiad, near Point Lynas, on May 26th, about a mile south of the place where Mr. Cummings saw a male on June 24th, 1902 (Zool. 1902, p. 434). The birds were frequenting a short stretch of low cliff which was clothed to the beach with thorn, bramble, and gorse. They were silent, in strong contrast with the noisy behaviour of these birds when they have young. There was nothing to lead us to suppose

that they were nesting at this date, and when we visited the spot ten days later we saw no signs of the birds.

The House-Martin is not plentiful inland, but on the coast there are many colonies. The nests are affixed to the cliff-face, generally beneath a projecting or overhanging rock ; at Bull Bay the birds were building in the entrances of some small caves. We saw two colonies on the limestone cliffs to the north of Moelfre. On May 22nd, when the birds were building, we threw down fragments of cotton-wool from the cliff top ; the birds, flying to and from their nests, caught the floating bits of wool as they passed. Several House-Sparrows, which were nesting at the same spot, darted out to catch the wool, but their attempts were very clumsy compared with the dash of the Martins. On these limestone cliffs there are small colonies of Swifts ; the birds breed in crevices in the disintegrating rock. Inland, the Swift is uncommon, but we met with it in the towns of Llanerchymedd and Llangefni, and saw a few hawking for flies above the bogs.

The Swallow is everywhere abundant, but the Sand-Martin appears to be very local. Suitable nesting-places for this species are scarce, but there is a small colony in the sand above the cliffs at Benllech Bay, and a few nest in an exposed bank on the sandhills at Lligwy Bay. Inland, we found the bird nesting in the banks of the Cefni near Bodffordd, but as a rule the banks of the inland streams are unsuited to the habits of the Sand-Martin. In the north we only came across one colony, in a mud cliff near Llanrhwydrys Church.

We failed to discover any fresh locality for the Tree-Sparrow ; we again visited the colony at Penmon, but did not meet with a single bird elsewhere. The House-Sparrow is abundant ; it nests in the cliffs, in ivy, or in holes in the rock. We found the bird breeding in crevices in the bare rock on Bodafon Mountain, and saw many bulky untidy nests in thorn hedges far from the neighbourhood of houses.

The Cormorant does not appear to breed on the north coast, except perhaps on the Middle Mouse, where the Bull Bay fishermen say it sometimes nests ; these men, however, may confuse it with the Shag. On May 28th we could see eggs in some of the nests in the large colony near Bwrdd Arthur, and in one nest at least the young were hatched. We met with odd birds all

round the coast, fishing or drying their wings on the rocks. The Shag breeds near Carmel Head ; on June 7th we saw three birds brooding in cracks near the top of the cliff. We were able to add the Shag to the list of birds breeding in the more southern district ; we did not see it at all in 1902. We twice saw old birds with well-developed crests at Dinmor Point, and, besides locating the nest, found a sucked egg, left by some Gull or Crow, on the top of the cliff. An adult Gannet flew past Ynys Moelfre when we were visiting the island on May 23rd. We did not discover any new breeding stations of the Guillemot or Razorbill, though we saw a few birds fishing at sea in different places.

Inland, Northern Anglesea is under rough cultivation, mostly pasture, but large tracts of land lie waste. Gorse invades the borders of many of the fields, and covers the stony outcrops, which defy the feeble efforts of the agriculturist ; bogs and marshy meadows, most of them bearing traces of attempts at drainage in their deep straight-cut ditches, lie in the flat valleys of the streams, while here and there is a llyn or pool, sometimes almost choked with aquatic vegetation, sometimes bare as a mountain tarn. There are surely few counties where the Nightjar is so abundant as it is in Anglesea. At early dawn—on two occasions we listened to the bird a few minutes after 3 a.m.—as well as at dusk, the churring notes are heard on all sides where there is rough ground ; one bird we saw was churring from the ridge of a tree-surrounded house, and another from a chimney top.

The Lesser Redpoll is as common in the eastern wooded parts as it is in the neighbourhood of the Straits, but further north it is much less frequent. On June 4th a nest at Lligwy contained five eggs, but another nest, near Llanfechell, was unfinished on June 8th. Both these nests lacked the usual foundation of twigs, being constructed externally of dried bents and a little wool. On June 11th we saw young Redpolls on the wing.

We met with the Whinchat in a few new localities ; on May 25th we heard a male singing at Llanallgo, and two days later one in the big bog, Cors-y-Bol. On the 30th we flushed a female from some thick gorse at Lligwy, but failed to find the nest. We saw none on the north coast, but there were three pairs on the marsh where the Cefni is crossed by the Holyhead Road, the

spot where we saw the bird in 1902. The Robin and Hedge-Sparrow are plentiful inland, the former bird even breeding in wild spots far away from houses. The Common Whitethroat is everywhere abundant.

Between Redwharf Bay and Point Lynas the Blackcap is thinly distributed, but nowhere so numerous as it is along the Straits. We did not see it in the north. The distribution of the Goldcrest is similar; we found it in plantations and woods in the east, and in one or two more inland localities near Llangefni and Llanerchymedd. Leaf-Warblers are practically confined to the wooded east, and the few plantations and thickets on the borders of the streams. The only place in the north where we heard the Chiffchaff was at Llanfairynghornwy, but in the south-east it is common. The Willow-Wren, very plentiful in the wooded parts, is rare in the north; some idea of its distribution may be gathered from the fact that on June 6th, when walking from Cemmaes to Carmel Head, we only noticed four pairs. Llys Dulas and Lligwy Woods were the only places where we heard the Wood-Wren; in these favourable localities it is common.

Llanfairynghornwy, at the foot of Garn Mountain, is an oasis; fine trees grow round the ancient church and rectory, attracting many of the tree-loving birds which are absent from the bare country which surrounds the village. Here a Chiffchaff was singing on June 10th, while Chaffinches and Willow-Wrens were not uncommon. On this day we heard the notes of young Goldfinches, but it was some time before we could discover the little birds—just out of the nest—perched amongst the luxuriant foliage of the sycamores. This was not the only place where we saw the Goldfinch; indeed, the bird is not uncommon in Northern and Eastern Anglesea. At Plas Bodafon we heard and saw three or four, and there were several at Llys Dulas, as well as at City Dulas and in the Lligwy Woods. In a small clump of sycamores—trees to which this species is partial—near Pentraeth, and in another spot near the same village, at Parciau and Marianglas, we met with pairs, while on the north coast, at Cemllyn—again in sycamores—we saw a party of five.

A Blue Tit was feeding young in a hole in the wall of the old church at Llanfairynghornwy, while another hole a few feet away

was occupied by a swarm of bees. Two pairs of Spotted Flycatchers were nesting near the church. We also came across the Spotted Flycatcher in the north, in the wooded valley between Cemmaes and Rhosbeirio, the churchyard at Llanfechell, and near Llanbadrig. In the east it is plentiful.

The Blue Tit is undoubtedly the commonest Titmouse; in the east it is abundant, and it is far from rare in the north. The Great Tit, though occurring in some numbers in the east, is uncommon in the north; we found young in the nest in a wall at Cae Mawr, near Llanerchymedd, and another nest, also containing young, in a wall at Coedana on June 11th. We only met with the Coal-Tit in the east, and did not see the Marsh Tit anywhere. Even in the east the Coal-Tit is not common; we saw two at Plas Bodafon, one in Lligwy Woods, one in a gorse-patch near Lligwy, and a pair feeding young which could fly near Llanerchymedd. Mr. Cummings saw a single Long-tailed Tit in Lligwy Woods on June 6th, but we did not meet with the bird elsewhere.

The Wren is everywhere abundant. A nest of this species, built against the stem of a dead hazel-bush, was decorated with grey lichen, resembling the lichen-covered branches. On May 26th we saw a Tree-Creeper at Llys Dulas, and another in the Lligwy Woods on June 6th. Though, naturally, rare in the north, it is somewhat remarkable that this bird, so abundant on the Straits, should be scarce in the plantations in the country round Redwharf Bay.

The Pied Wagtail, though nowhere plentiful, is generally distributed; we did not find the Grey Wagtail anywhere in the north. The Cefni at Llangefn, running through a wooded valley—almost a gorge—and falling over rocks like a mountain torrent, appears suitable for the species, as well as for the Dipper, a bird we failed to find. Absent from the treeless north, the Tree Pipit is rare even in the east; we heard two singing at Plas Bodafon, and on May 26th another at Llys Dulas, which is practically the northern limit of its range in Anglesea. Lligwy Woods, the Cefni Valley near Llangefn, and Plas Gwynn, Pentraeth, were the only other places where we heard the bird.

The Greenfinch is everywhere common, and the Chaffinch

well distributed but not so plentiful ; the Bullfinch is common in the east, but rare further north. Mr. Cummings saw a single pair on the coast between Llys Dulas and Point Lynas. The Yellow Bunting and Corn-Bunting occur generally, the latter being commonest near the sea.

We did not meet with the Jay, but we found the Magpie nesting near Llanerchymedd, Rhosbeirio, and at Cors Ddraenog. We saw birds at Parciau, Marianglas, Llys Dulas, City Dulas, Cemmaes, Carmel, Llanfairynghornwy, Llanfechell, and Rhos Goch. The sycamores in the vicinity of many of the larger farms are occupied by Rooks ; some of the rookeries being of considerable size.

The Green Woodpecker is not uncommon in the eastern woods ; we met with it at Dulas, Llanallgo, Parciau, and Pentraeth. In Lligwy Woods we found a nesting-hole in a beech not three feet from the ground. The Cuckoo is abundant in all parts.

We heard the Barn-Owl nightly at Lligwy and Marianglas, and on May 31st we saw one on the wing at mid-day at Cors Ddraenog. In October, 1901, we saw this species at Cors Bodwrog, and Mr. Cummings has known it to nest near Cemmaes. The gamekeepers said that the Tawny Owl occurs at Parciau, Lligwy, and elsewhere in the east ; and judging from the character of the country and the abundance of the bird at Penmon, this is probably the case. This species, however, is silent at the end of May and beginning of June, so that we were unable to verify the statements. We saw one bird in a Pheasant-covert at Bodffordd on June 2nd, and on the 13th, a young bird, just able to fly, in some sycamores at Llanidan, on the Straits. Our attention was directed to this bird by the commotion among the Blackbirds and Chaffinches.

The Sparrow-Hawk nests at Tyn-y-gongl ; a female flew from a nest, containing six much incubated eggs, in the top of a spruce, on May 30th. In an adjoining tree was the nest of a previous year. We saw another bird in the southern district—at Llanidan—on June 13th.

Pheasants are hand-reared at Parciau, Llys Dulas, and elsewhere, but in the north there is little preservation ; we saw a few birds near Llanbadrig. The country is a fairly good one for

Partridges. The Corn-Crake abounds, as it does everywhere in Anglesea.

The Moorhen is common in the bogs and round the llyns, and we saw Coots on four of the small lakes—Llyn Frogwy, Llyn Geirian, Llyn Hafodol, and the llyn near Llanfaethlu. On the first three of these waters, on Llyn Bolgolched, and on the pool in Cors Ddraenog, we either saw the Dabchick, or heard its chattering cry. A pair or two of Common Sandpipers nest on the margin of most of these llyns. On a rocky mound by a shallow llyn near Llanfflewyn, we found a nest containing two newly hatched young, with the egg-shells lying near them. The nest—little more than a scratched-out hollow—was under some gorse, and was so well concealed that we only discovered it when we flushed the female. She did not resort to the customary simulated disability to divert our attention, but joined the male, who was piping anxiously hard by, and evinced her anxiety by piping intermittently so long as we were in the vicinity of the nest.

Snipe-bogs are characteristic of inland Anglesea. Some attempts have been made to drain most of these wild marshes, and often the only paths by which one can cross them are the heaps of dried mud, taken from and bordering the ditches. Much of the bog-land is now coarse pasture, grazed by long-horned black cattle, but large tracts still defy all attempts to reclaim them. Undoubtedly the Snipe is the sporting bird of the island, for not only does it swarm in the bogs, but it is abundant in the many wet, rush-grown fields. When we crossed the bogs the “chipper-chipper” and the bleat of the drumming birds were constant sounds; Snipe were everywhere. On May 27th we found young birds just able to fly; but a few days later we came across two which had no wing-quills showing. The single old bird in charge of these young ones rose when we approached, crying *skeap, skeap*, then mounting high in the air, commenced to drum. A few moments later it came down and passed us repeatedly, flying just clear of the ground, but making no sound. The young were bright chestnut-brown, broadly striped dorsally with black bands, and the plumules of these bands were tipped with silvery white, giving the black a frosted appearance. The head, wings and thighs were trans-

versely barred with black, the under parts chestnut. The irides were dark brown, the legs and feet lead-blue; the bill, shorter than the head, was straight and broad throughout its whole length, and shaded from dark-lead to almost black. The little ones crouched, their velvety black and rich browns reminding one of the colours of the larvæ of some bombycid moths, when once we had discovered them, and made no attempt to escape after they had been handled and again placed upon the ground. We left them for some time, to allow the old bird to rejoin them; but though it alighted near, and possibly actually went to them, they had not moved when we returned to look at them again.

The bogs are the strongholds of the Meadow-Pipit in Anglesea, though the bird is generally distributed; the largest bog, Cors-y-Bol, is populated by great numbers of Meadow-Pipits, Sky-Larks, and Reed-Buntings. The last-named bird is only present in the bogs and marshes, but in many of these it abounds. On May 27th we found three nests on Cors-y-Bol, within a few feet of one another. From one of these, which contained one egg and three young birds just hatched, the male bird flew out and fluttered along the ground with trailing wings and tail expanded.

Moorhens breed on the bogs; we found them with young in the ditches. Here also Mallards were in charge of flappers, squattering along the water, while their young dived and hid in the aquatic vegetation. One duck, when her brood had disappeared, rose from the water and circled round us in short sluggish flights, only just clearing the ground as she flew. She frequently alighted, pitching heavily as if wounded, and then, with outspread wings and tail, and quacking loudly, dragged herself along the ground like a maimed bird pursued by some enemy. A duck Teal on the same bog rose from a very wet spot — a deep morass grown with buck-bean and rushes where without doubt her young were hiding—and behaved in a similar manner. In both cases the flight was noticeably sluggish. About a mile from this place we had flushed a drake Teal. Lapwings had commenced to pack by May 31st, on which date we saw a party of about a score on one of the bogs; we saw another party of about the same size a few days later. On this bog there were several Black-headed Gulls in mature plumage,

but we found no breeding colony on this or any other bog or llyn ; probably these were non-breeding birds, for it is doubtful if there is a colony in the island.

One of the bogs which we visited is divided into two parts by the artificially cut channel through which the main stream flows ; the lower part of the marsh was fairly dry, mainly owing to the then hot weather, and here stunted ling, coarse grass and bog-myrtle grow. Among the ling, right in the open, we found a Pheasant on her nest. On this bog, but a few feet above sea-level, at least half a dozen pairs of Curlews were nesting. All the birds were demonstrative ; but one, which certainly had young somewhere in the immediate neighbourhood, flew round and over us with angry cries quite different from the usual calls of this species. When at a distance it gave the bubbling breeding cry, and several times called *courlie*. We flushed an anxious Merlin several times on this bog ; and on June 4th Mr. Cummings watched a male Merlin behave in a curious manner. Starting from a grassy mound, it flew close to the ground for some twenty yards ; then soaring, but to no great altitude, it hovered for a few seconds, calling *kek, kek, kek*, and returned to the same mound from which it had risen. This performance was repeated several times without variation, and when Mr. Cumming arrived at the perching spot, he flushed the hen bird from a nest which was situated in one of the dried-up hollows between the tussocks and dead bog-myrtle. The three fresh eggs were placed on a few bits of dry grass, which served for a nest lining, and were in no way covered or sheltered by the surrounding herbage.

On the eastern border of the bog the ground rises somewhat abruptly, a thicket of hazel and bramble covering the hillside, which is surmounted by an ivy-covered limestone terrace, where Stock-Doves and Kestrels nest. On the other side a narrow belt of trees—mostly firs—half encloses the wilder, higher portion of the bog, a rough waste of huge tussocks of sedge and ancient heather, dotted with birches and alders and clumps of gorse. In the tree-belt, where many Wood-Pigeons and a Magpie were nesting, we watched, on May 24th, a Lesser Whitethroat. For some time the bird sang in the plantation and then crossed the marsh, a distance of some three hundred yards, to the hazel copse on the hillside, where we heard it

singing frequently, but failed to find a nest. The bird sang with vigour in the sultry weather, keeping close to one particular spot. On three different days we both saw and heard it, but we could not rouse a female from the dense jungle of brambles and hazel.

On May 25th we saw a Garden-Warbler in the belt of trees. The bird was silent. This was the only one we saw in the north or north-east. A pair of Garden-Warblers were nesting in a bramble near Plas Newydd Park-gate, at the spot where we heard the bird in 1902 ; we found four fresh eggs in the nest on June 13th.

Two Grasshopper-Warblers were in full song on the bog in the broiling heat at mid-day on May 24th, and on the following day we put up two pairs, and heard a third bird singing in another part of the bog. The Grasshopper-Warbler abounds in North-east Anglesea, in bogs as well as on the mynyddau, but is less common in the north. We frequently heard the bird, both in the daytime and in the evening, near Redwharf Bay, Cemmaes, Marianglas, Llanerchymedd, and other places. One near Lligwy Bay was reeling in a willow-bush about 9 p.m. ; it stopped when we approached, but when the bush was struck with a walking-stick burst into ear-piercing song, singing again and again while we stood but four feet away.

While we were struggling through the old growth of ling and gorse on the higher portion of the bog, stepping from one great clump of sedge to another, or wading in the water which filled the hollows between them, a Short-eared Owl rose a few yards in front of us, and mounting high into the air, sailed above our heads for more than an hour. It had little of the flapping, reeling flight of other Owls, but sailed on its long narrow rounded wings for minutes together without a wing-beat. The strong sunlight passing through the primaries and secondaries gave the appearance of a broad light fringe to the mantle. While it swung across the moor, high above our heads, its rounded wings and long tail made it appear more like some huge shark-moth outlined against the sky than a bird. It watched us constantly, both while we beat the moor, searching for its nest, and when we lay on the ling to observe its actions ; it moved its round-faced head from side to side, and frequently uttered a fierce barking cry—*whowk, whowk*. Passing birds noticed it and

flew screaming to mob it; a male Merlin stooped at it several times, a Curlew and a Black-headed Gull attacked it; but it paid little attention to its assailants, save that it occasionally clapped its wings sharply together. As the Owl drifted to and fro, it went, at intervals, through a curious performance, the significance of which is not clear. It smote its wings together sharply two or three times, making them meet, not only above its back as a Nightjar does, but bringing them together beneath its belly, and at the same time shaking its whole body from side to side. This demonstration, accompanied as it was by a noise like the loud clapping of hands, was probably intended to terrify us and the birds which assaulted it from time to time. Whatever its function may have been, it was repeated several times on this day and when we visited the moor on subsequent occasions. Sometimes the bird perched for a few seconds in one or other of the small alders, or on the ground; but most of the time we were on the moor it remained in the air above us, never travelling far away. Neither when on the wing, nor when the bird was perching, were its ear-tufts visible. Scattered pellets lay about the moss, and here and there on the top of the furze-bushes were the feathers and remains of small birds, but some of these may have been the *débris* left by Merlins. In one spot we found a fragment of egg-shell, but we failed to find the young, or to put up a second old bird. On the following day, and again a few days later, we visited the place, putting the bird up from about the same spot; on each occasion it behaved as on our former visit. On June 4th Mr. Cummings was at the moss alone, and fortunately found a fledged young bird crouching in the ling. When he took it up the little bird made no resistance, but kept its eyes upon him. When he replaced it on the ground, however, and touched it again, it snapped and hissed, assuming a terrifying attitude by puffing out its feathers and arching its wings above its back, after the manner of young Long-eared Owls. It also made several fierce attempts to fly at his face when he was bending over it. Meanwhile the old bird became terribly excited, swooping down close to his head, and uttering a wilder and more angry note than the barking *whouk*, which sounded like *quack, quack, quack*. It pitched on the ground near him, assuming the terrifying attitude which is common to many of the Owls, and rolling its head from side to

side. As he left the moor the old bird followed, swooping close to his head repeatedly; indeed, he several times expected to be struck. So ferocious and persistent were these attacks, when Mr. Cummings had the young bird in his hand, that he was glad to take shelter under a tree. The adult Owl did not strike its wings together on this occasion in the way it had done on previous days.

The plumage of the young Short-eared Owl is similar in many respects to that of the adult, but is somewhat darker; the beak is lead-coloured, and surrounded by white bristles, and there is a pronounced crescent-shaped white rim above the eye, near the top of the facial disc. The bird was almost ready to fly, and the eggs must therefore have been laid early in April. The pellets we picked up were composed chiefly of Field-Voles and Common Shrews, but there were also remains of one Water-Shrew, one young Brown Rat, a few Wood-Mice, and a small Warbler.

We paid a flying visit to Penmon and Puffin Island. The Shag at Dinmor was the only noteworthy addition to the list of birds which we noted in 1902. On May 29th there was not a single Puffin on the island, though there were many swimming in the sea with Guillemots. Mr. O. V. Aplin's experience was similar on May 21st and 22nd; the birds were undoubtedly late in coming to land in this cold and backward spring.

On May 28th a Green Woodpecker flew from an old nesting-hole about four feet above the ground, in a roadside oak at Penmon. The old cavity had been deepened, and much litter of rotten wood lay at the foot of the tree. Four or five stones, perhaps dropped in by passing boys, were embedded in the chips at the bottom of the hole, and on these stones was a single fresh egg. Another hole, in an elder in the park, was but three feet from the ground.

When Mr. Aplin visited Penmon on May 21st, he saw a Purple Sandpiper, feeding with customary tameness on the rocks below the lighthouse buildings; he noticed a Corn-Crake on Puffin Island, and we saw the Common Whitethroat, Linnet, and Robin there, birds which we did not see in 1902.

We spent a few days at Newborough, visiting Malldraeth Marsh and the Warren. Among the many Shield-Ducks, feeding on the sands fringing Malldraeth Marsh, on June 12th, were a

pair of old birds with two young in down only a few days old. When the old birds caught sight of us they ran for a few yards and then rose; the young ones scuttled away at a great pace towards the river, which at low water was perhaps half a mile away across the sands. It was only after a smart chase across the wet sand that we managed to come up with one of the young birds. When hard pressed the little creature elevated its downy wings to assist it in flight; it doubled and turned this way and that with such rapidity that we had the greatest difficulty in securing it. As it ran across the sand in the sun's eye, it was almost invisible from a little distance, and we lost sight of the other altogether. The old birds meanwhile flew round us with guttural cries of alarm, but they made no attempt to lure us away by feigning injury. Six young Sheld-Ducks in down, rather older than these two, were swimming on the lagoon behind the embankment at Malldraeth Yard. A passing man sent his dog into the water to catch them, and for a quarter of an hour the dog swam gamely after the little birds. The party scattered as soon as the dog approached, and whenever one of the ducklings was in danger of being caught, it would dive and come up again a few feet away. The dog then turned its attention to the nearest duckling which was swimming, and failed to capture it in just the same way. The birds kept to the open water, and never swam into the weeds or shallows; and after a time the dog began to show signs of fatigue. When its master called it out it was exhausted, but the ducklings were apparently quite fresh. When we passed the place a little later the old ones were swimming with their brood; neither of them had come near while the dog was chasing the little ones. We had no means of ascertaining if the old birds purposely kept away; possibly they did, their instinct teaching them that when the young are on the water, where they are so well able to take care of themselves, no serious danger can menace them. In this case the little birds were never in any real danger.

On May 24th we saw two drake Shovelers on the llyns by the old coal-workings on the marsh near Gaerwen, where we had seen the species before. Herons are abundant in this district, in contrast with the northern part of the island, where we saw very few. On June 12th eleven birds, old and young, were standing with many Black-headed Gulls in a tidal creek by the

roadside at Malldraeth Yard ; they were resting, but every now and then one would plunge its beak into the stream and capture a small eel or other fish. We found Oystercatchers nesting on the beach by the sandhills in several places on the Warren ; two of these nests, on sand, had no lining, but a third, on shingle, was lined with fragments of beach-worn shells. When a brooding Oystercatcher sights a man from a distance it always leaves the nest silently, running for some distance before rising, if it takes wing at all. On June 12th we found a nest in a hollow on the Warren, perhaps a quarter of a mile from the sea ; the bird ran from the nest and disappeared amongst the sandhills. The nest was a clean cut hollow in the turf, seven inches in diameter, and two inches deep in the centre, lined with a few dead twigs of dwarf willow, and many dead shells of a small land snail, *Helix caperata*. On the same day we saw a hen Kestrel, heavily burdened, fly slowly across the Warren, and alight on a rock. When we reached the spot the bird rose and let fall a young Starling, which was fully feathered, and had been on the wing for some time ; a bird of this size is rarely taken by the Kestrel. We were shown two clutches of Merlins' eggs which had been taken on the sandhills this spring.

The colony of Common Terns on Ynys-yr-adar is a large one, and when we visited the stack on June 12th the birds rose and flew above us in a screaming white cloud. Old plants of *Lavatera arborea* and *Beta maritima* grow in the cracks in the jagged rocks, the woody stems of the beet being often as thick as one's wrist. Some of the nests were built of dead stems, and the eggs placed amongst the herbage, but other eggs were placed on the bare rock without any attempt at a nest. In June, 1901, Mr. Cummings saw a Black Guillemot in full breeding plumage on this stack ; the bird, it seems, had been noticed by the pilot for about three weeks previously, but he could not identify it with any bird he knew. It was solitary and very shy.

On June 11th a party of at least twenty-three Sanderlings in breeding plumage were feeding on the beach in Llanddwyn Bay. When crossing the beach next day we picked up one which had been shot ; it was in full summer dress. Three Common Scoters were swimming close inshore in this bay on the evening of the 11th, and on the 12th we saw a pair of Great Crested Grebes in full breeding plumage on the sea in Malldraeth Bay.

## NOTES AND QUERIES.

## MAMMALIA.

**Gestation of Badgers.**—The article in ‘The Zoologist’ for December, 1908, on this interesting subject made me refer to sundry notes in my possession. Some years ago I made inquiries of Mr. J. Paterson, Rutherford, near Kelso, who has kept Badgers for many years, and who has bred these interesting animals in confinement, and reared their young. He had no doubt as to the period of gestation, *viz.* eight months. Mr. Paterson attends to his Badgers himself, and so his statement is the result of personal observation, and not information received second hand, nor the theories of others. He has seen the act of copulation, and the young were produced in due course eight months after. He has found his female Badgers come in season but once a year, towards the end of June or beginning of July, the young being born towards the end of February or March following. The rutting season of the female seems to come on each year almost to a day, and the young are similarly born almost to a day eight months after copulation. One young female Badger had her cubs on her own birthday. Two female Badgers, housed together, have been known by Mr. Paterson to suckle indiscriminately the cubs of each other in the most amicable manner. I trust that the above information, which may be relied on as accurate, may be of interest to readers of ‘The Zoologist.’—CHARLES COOK (11, Belgrave Crescent, Edinburgh).

**The Lesser Shrew in Yorkshire.**—When out for a walk on Dec. 6th, 1908, my daughter picked up a dead example of the Lesser Shrew (*Sorex pygmaeus*) in Long Lane, Ackworth, in the West Riding. Within a few inches of it was laid a dead Mouse, which, from the description, I think was a Short-tailed Field-Vole (*Arvicola agrestis*). Although the Lesser Shrew has been reported from widely separated localities in Yorkshire, it has not been frequently identified in the county; but it is not at all improbable that it may often have been overlooked and not distinguished from the Common Shrew (*Sorex araneus*). Dr. P. Chalmers Mitchell kindly identified the specimen.—WALTER B. ARUNDEL (High Ackworth, Pontefract).

## AVES.

**British Examples of the White-spotted Bluethroat (*Cyanecula wolfi*).—**In confirmation of my remarks on the first recorded British occurrence of this species, at Scarborough, in the year 1876 (Zool. 1903, p. 23), may I be allowed, in anticipation of the forthcoming 'Birds of Yorkshire,' to quote from a letter by the late Alfred Roberts, who stuffed the bird in question, written to Mr. W. Eagle Clarke, which runs as follows :—

" Scarborough, 1st January, 1880. A fine female specimen of the Blue-throated Warbler was found dead under the telegraph wires, near Scarborough, by the late John Young, gamekeeper to Lord Londesborough. . . . *It had a white satiny spot in the centre of the blue throat.*\* The specimen is in the possession of Mrs. Young."

This letter may perhaps serve as an answer to Mr. Nicoll's comments (Zool. 1903, p. 431), which cast a doubt on the authenticity of the above record.—T. H. NELSON (The Cliffe, Redcar).

**Great Grey Shrike (*Lanius excubitor*) in Cheshire.—**On Dec. 25th, when riding along a lane at Redesmere, Capesthorpe, I saw a strange bird with long rounded tail and undulating flight settle on the topmost twig of an oak some little distance away, from which it flew to a similar position on another tree before I could approach sufficiently near to see it clearly. In this second position I was able to obtain a better although not a good view of it before it again moved to another tree-top some few hundred yards away. I then was able to see it was a Great Grey Shrike in dull plumage, probably of the immature bird. When it flew I could just see that it appeared to have the double white wing-bar. A Starling, evidently with a disposition to mob it, flew into the same tree, and its presence seemed to irritate the Shrike somewhat, as it assumed a threatening attitude. I was able then to form a fair comparison as to the size of the two birds.—FRANK S. GRAVES (Ballamoar, Alderley Edge).

**Waxwings in North of Ireland.—**In 'The Zoologist,' 1903, p. 456, Mr. W. C. Wright states there are only two records of the Waxwing (*Ampelis garrulus*) for the North of Ireland during the past forty years. This is not correct, and might mislead students of Irish ornithology in the future. In addition to the two occurrences quoted, the following are on record :—1881, one, Donegal; 1893, three, Antrim; two, Londonderry; 1895, one, Armagh; 1901, one, Down.—ROBERT PATERSON (Holywood, Co. Down).

\* The italics are mine.—T. H. N.

Late Appearance of House-Martins at Eastbourne.—I think it may be said that the House-Martin is generally to be seen at Eastbourne during the third week in November, but seldom so late as the 26th. The latest ever seen by me were two at Beachy Head, Dec. 1st, 1888, and another was seen there by my brother on the 9th of that month.—ROBERT MORRIS ("Fernhurst," Uckfield).

"Xanthochroism" in the Greenfinch (*Ligurinus chloris*).—I have just seen, at Mr. Nash's, the birdstuffer, in Lincoln, a curious variety of the Greenfinch. The colour of the bird is chiefly of a pale canary-yellow, brighter on the upper tail-coverts and paler on the head and under parts. The four right rectrices and some of the primaries and secondaries appear of the normal colour, while others are white or pale yellow. The primaries show the conspicuous yellow outer webs, so the bird was probably of the male sex. The bird presents a curious washed-out appearance, and there is no trace of olive-green in the plumage. I was told that it had been obtained about Dec. 12th, 1903, a few miles from the city of Lincoln. I am unaware whether this species is much subject to variation; perhaps this specimen resembled the one recorded in 'The Zoologist' for 1885, p. 110. Mr. Nash also received about the same time a Yellow Bunting, which, were it not for the shape of its bill and a few darker feathers in the plumage, might easily be mistaken for a cage Canary.—F. L. BLATHWAYT (5, Monks Leys Terrace, Lincoln).

Snow-Geese (*Chen hyperboreus*) in Co. Mayo.—Having been informed by Mr. Williams of the capture of the pair of Snow-Geese in Co. Longford (Zool. 1903, p. 459), I asked my friend Mr. J. Knox, of Belgarriff, Foxford, to look out for any white Wild Geese with black-tipped wings visiting the Wild Goose haunts of this neighbourhood; and, strange to say, on Dec. 1st, when walking in his avenue on that day, four Snow-Geese passed over his head (quite within shot) on their way to that great Wild Goose haunt of North Mayo—the wide expanse of Foxford meadows on the banks of the River Moy. There was no mistake in identification, for the black-tipped wings showed out strongly against the white plumage. One day about the middle of November last, Capt. Kirkwood, of Bartragh, had his attention called by his daughter to a flock of eight birds flying over the island from the bay. They appeared perfectly white, but, owing to the distance, he did not notice any black on the wings; but what chiefly attracted his attention was their small size—not half as large as Swans, which he at first thought them to be.—ROBERT WARREN (Moyview, Ballina).

**Ferruginous Duck in Yorkshire.**—In the spring of last year four examples of the Ferruginous or White-eyed Duck (*Fuligula nyroca*) put in an appearance on a reedy sheet of water within a short distance of the village of Ackworth, in the West Riding. One of them—an adult male—was shot, and at the same time two others were more or less incapacitated, while a few days after an adult female was secured, but I do not know whether it was one of those which had been injured. I saw the male the same day that it was procured, and I examined the female immediately after it was shot. As the soft parts of several preserved specimens of this species which I have recently seen in public institutions are not correct in colour, I may state that the bill of each of the birds obtained was dark blue, with a black nail; the legs, toes, and webs were lead-colour, the webs being darker than the other parts; the irides of the male were milk-white, and those of the female were slaty brown—slate-colour, shot or shaded with brown from the outer edge. Some authorities, somewhat vaguely, describe the irides of the female Ferruginous Duck as being not so white as, or less conspicuously white than, those of the male. The other two Ducks, which are male and female, remained and still continue on the piece of water. The male is frequently seen on the water, and sometimes on the wing. The female is of a more retiring disposition. Both Ducks are, however, strong on the wing, and have been for some time. The male has been seen within the last two or three days. On the same water, in the spring of 1901, a male Tufted Duck (*Fuligula cristata*), that was paired, was shot in the wing, incapacitating it for flight for a time, and it and its mate remained and nested, and brought off a brood of seven. There is no evidence that the Ferruginous Duck nested.—WALTER B. ARUNDEL (High Ackworth, Pontefract).

**Great Skua (Stercorarius catarrhactes) in the Isle of Man.**—Early in December, 1903, I saw, in the hands of Mr. Adams, taxidermist, of Douglas, a specimen of this species. It had been during the late autumn or early winter taken at Douglas on a baited hook, and had been kept a short time alive. Scarce in the Irish Sea, this Skua is included by Mr. Kermode in his Manx list (1901), with the note, "Off the south of the island in autumn." This is the first instance of its being obtained here which has come under my notice.—P. RALFE (The Parade, Castletown, Isle of Man).

**Pomatorhine Skuas (Stercorarius pomatorhinus) in Suffolk.**—On Dec. 3rd last I received two fresh killed young birds of this species from Lowestoft, and on the 19th another was shot in Thorpe Mere,

near Aldeburgh, which the Rev. H. A. Harris was good enough to send me in the flesh. One or two local specimens have also been lately received by Mr. Hudson, the Ipswich birdstuffer. Mr. Patterson, in his list of the "Birds of Yarmouth" (Zool. 1901, p. 296), says that "this species is the most frequent of the Skuas on the east coast of Norfolk," but in Suffolk it is a decidedly rare bird, and I have no records of its occurrence during the last ten years.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

**Birds of Oxfordshire or Buckinghamshire?**—It is not my purpose to offer any criticisms on the ornithology of Mr. O. V. Aplin's interesting "Notes on Oxfordshire Ornithology" (Zool. 1903, pp. 444 *et seq.*), but simply to stand up for the rights of my own county, Buckinghamshire, for which I claim a share of the occurrences credited to Mr. Aplin's county. "The Ornithology of Henley-on-Thames" certainly sounds as if it referred to Oxfordshire, but the river is the boundary of the the county, so that Berkshire is within the proverbial stone's throw of the town, and Buckinghamshire reaches within three-quarters of a mile of it; so that any notes concerning the district surrounding Henley must refer almost equally to these three counties, and I trust therefore that Mr. Aplin will pardon my thus championing Bucks.

**WHITE-TAILED EAGLE** (p. 445).—By far the larger part of Fawley Court Park is in Bucks, so that unless the particular fir-plantation was specified as in Oxon, the former county should be credited with the specimen.

**MERLIN.**—Skirmett (whence I write) is not "on the hills in Bucks," but the hamlet lies in a valley running nearly due south to the Thames about four miles off. It is practically surrounded by hills, especially on the north, east, and west. I wonder if the nest of this species reported in 1864 was on what is now my land! I may point out that Wooburn (always spelt with double o), mentioned in the footnote to this species, is in Bucks, though its neighbour Cookham is in Berks.

**Stonor Park** (p. 446) is fairly claimed as Oxfordshire, but the house is not more than  $2\frac{1}{2}$  miles, "as the crow flies," from whence I write, and much of the estate, *i.e.* of "the shooting" adjoining this, is in Bucks; so if the Goshawk were not obtained actually in the Park, it may well have been a Bucks specimen.

**BUZZARD.**—I may venture to state that on May 18th, 1900, I saw a Buzzard on the wing near the new National School, Hambleden. I only saw it through the (open) window of a close-fly, but am satisfied I did not mistake a Kestrel for this species! I subsequently learnt

that a Buzzard was killed at Datchet (Bucks) in the following month, which emboldens me to "have the courage of my convictions"!

**GOLDEN ORIOLE** (p. 447).—Turville Park is in Bucks (as well as Ibstone and North End), but on the Oxon border, so "about the borders" might apply to the latter county. Reported to have nested near North End in 1902, but whether in Bucks or outside the limits of Turville parish, in Oxon, I do not know. The nest was taken.

**CIRL-BUNTING** and **HAWFINCH** (p. 448).—Part of Henley Park is in Bucks.

Medmenham (p. 449) is in Bucks (not Berks). It is correctly assigned on p. 458.

**ROCK-DOVE**.—Used to breed on the chalk escarpment near the river edge, between Danesfield and Harleyford (between Medmenham and Great Marlow), Bucks. Unfortunately I neglected to secure any specimens before shooting on the river was stopped, and do not know whether they still occur there. On one occasion many years ago I flushed a specimen from a small gravel-pit in a wood near Little Marlow.

**QUAIL**.—One shot while Partridge-shooting on my land here, Sept. 20th, 1902, and I was told that some had been heard calling here in the spring of 1900.

**STONE CURLEW** (p. 450).—Fly constantly backwards and forwards past this house every evening during four or four and a half months in the summer, and, I believe, breed in a neighbouring plantation, on the side of a Chiltern.

**HERON**.—There is a flourishing herony now at Oaken Grove, Bucks, near Greenlands, where birds and nests are carefully preserved by Mr. W. D. Mackenzie, of Fawley Court. The Harleyford (Bucks, Great Marlow parish) herony has of late years been much disturbed by the cutting down of trees and shooting, and I fear there are very few nests there now.

**PURPLE HERON**.—"Near Reading." As Reading is in Berks, the specimen, in the absence of more precise locality, must reckon as belonging to that county, though the opposite bank of the river is Oxfordshire.

**NIGHT HERON**.—"In the neighbourhood of Oxford." The converse of the last sentence applies to this.

**CORN-CRAKE** (p. 451).—So far as my experience goes, this species has only become scarce since 1899, and from the same year the Turtle-Dove has become extraordinarily numerous.

**RED-NECKED GREBE** (p. 458).—Greenlands, Hambleden parish, is in

Bucks (not Berks). It is on the river-bank just above Hambleden Lock.

CORMORANT.—I saw either a Cormorant or Shag on the river off Great Marlow a good many years ago, but could not see which species it was, as it was in a very thick fog. Magpie Eyot is, I believe, reckoned as Bucks (as well as Medmenham and Marlow), but if not, it would be Berks, and several miles from Oxfordshire.—A. H. COCKS (Poynetts, Skirmett, near Henley-on-Thames).

#### PISCES.

Porbeagle Shark in Killala Bay.—On Nov. 20th, 1903, when walking along the Enniscrone Sands, I found two of these fish thrown up by the surf; they were both females. The largest specimen measured 8 ft. 1 in. from tip of snout to end of longest lobe of tail, and the second about 6 in. less. On inquiry, I learned that these specimens and three others were entangled in the Herring-nets a few nights previously, and killed by the fishermen.—ROBERT WARREN (Moyview, Ballina).

## NOTICES OF NEW BOOKS.

*Catalogue of the Noctuidæ in the Collection of the British Museum.*

By Sir GEORGE F. HAMPSON, Bart. Published by the Trustees of the British Museum.

THIS is the fourth volume of the "Catalogue of the Lepidoptera Phalanæ"; it is devoted to the *Noctuidæ*, so far as the *Agrotinæ* extend, and amply describes and deals with some 1200 species. As the whole *Noctuidæ* is estimated to contain some ten to twelve thousand described species, the magnitude of the proposed work may be appraised by the size of this large and dominant family alone.

To bring such a large and difficult family into a consistent whole, and with monographic revision, is a task that will be greatly valued by all lepidopterists. Those workers who have been compelled to deal with the *Noctuidæ*, when enumerating some lepidopteral fauna, will scarcely need to be reminded of the classificatory chaos that has hitherto existed, not only with species and genera, but even as regards families; for Sir George is now including in the *Noctuidæ* many genera which perhaps, owing to their bright coloration, have been arranged erroneously in other families. Then again, with these obscure moths, the unfortunate entomologist who has been compelled to describe species by the exigencies of faunistic publication, has frequently had to run appalling risks of redescription, and the details of the synonymy in this volume will show how many have fallen into the synonymous pit. From the vast material contained in the British Museum, and the willing help afforded by lepidopterists in all parts of the world, the author has been enabled to compare and digest his material; so that we may now run few risks of confusion, be able to have an adequate grasp of the *Noctuidæ* as a whole, and can tabulate reliable facts in the study of the geographical distribution of insects.

It is only from those who have engaged in monographic work that Sir G. Hampson can hope for real sympathetic appreciation, while it is also from the same quarter that criticism must be expected. Human nature being as it is, we do not rejoice at seeing our specific creations relegated to the synonymous basket; some may regret that their classificatory proposals have not been followed, others that their species are regarded as varieties, their varieties estimated as species, their new genera as unnecessary foundations, or the genera they have used as mistaken ones; and yet this is the very work that a revisionist must undertake. Again, the monographer, strange to say, is always still the pioneer, for no classification is final, no revision the last word; it is the excellence of one monograph that makes a better one possible, and this is no paradox, but is an acknowledgment which is often absent, or none too kindly made in a subsequent work. By the aid of a good descriptive catalogue like this volume, it becomes possible for any capable entomologist to make an exhaustive study of some small and special group, when, if an error can be discovered, however small, or a misconception sustained, the fact is usually accentuated with much satisfaction by an early application of the printing machine. Such is the fate of the monographic revisionist! He is never spoiled by universal flattery. He is supposed to correct any error, and expected to never make one himself. Seldom is the dictum of Horace applied, that the best man is one that hath fewest faults.

This volume is a standard one, and in the best sense advances the study of Lepidoptera.

---

*Evolution and Adaptation.* By THOMAS HUNT MORGAN, Ph.D.  
The Macmillan Company, Ltd.

THIS book is another contribution to the opinion that natural selection is not the dominant factor in evolution as held by so many biologists. For an American treatise, it is noteworthy by its very qualified Lamarckian adhesion. On the question of the inheritance of acquired characters, Dr. Morgan's verdict is "not proven," with the rider that he is "not sure that we should not be justified at present in claiming that the theory is unnecessary, and even improbable." The mutation theory of

De Vries finds most favour with the author, who concludes that "a species does not arise from another one because it is better adapted"; but that "the formation of the new species is, as a rule, quite independent of its adaptive value in regard to the parent species"; while after "it has appeared, its survival will depend upon whether it can find a place in nature where it can exist and leave descendants." This view is quite distinct from the theory of Darwin, and is called the "*survival of species.*" The final paragraph will tend to further elucidate Dr. Morgan's meaning: "If we suppose that new mutations and 'definitely' inherited variations suddenly appear, some of which will find an environment to which they are more or less fitted, we can see how evolution may have gone on without assuming new species have been formed through a process of competition. Nature's supreme test is survival. She makes new forms to bring them to this test through mutation, and does not remodel old forms through a process of individual selection."

Quite apart from the enunciation of any particular view on these debated questions, the volume is a particularly good and accurate guide to the teachings of a large number of natural philosophers, including Darwin, Weismann, Lamarck, Mendel, De Vries, and Nägeli, with references to others who are now less read, and apparently even less remembered. We think on this point that the author would have added to the value of a really good book by referential footnotes, or an appended bibliography.

This Darwinian literature—the inception of which is all due to the great master, and must bear his name—is now capable of forming a library by itself. Like the historic verger who said that he had heard the Hulsean Lectures for thirty years, and yet thanked God that he was still a Christian, we turn from the perusal of these many books, from the rival doctrines of neo-Darwinians and neo-Lamarckians, and feel profoundly satisfied that we are still among the evolutionists.

## EDITORIAL GLEANINGS.

THE following extract is from our weekly contemporary, 'The African World' :—

" It appears from the last report on the Uganda Protectorate that the game regulations, which have now been in force for the last three years, have worked well, and no instance has been brought to notice during the year of any breach of the rules by sportsmen. In the tracts immediately under control the provisions of the regulations have been fairly well kept by the natives, but in the more distant parts this has not always been the case. The most direct result of the regulations has been to afford partial immunity to the large herds of Elephants in the Western Province, which are now consequently said to be on the increase. These herds roam at different seasons of the year along the western shore of Lake Albert, between Unyoro, Toro, and Ankol, and these districts, with the Nile Province, afford perhaps the best field in this part of Africa to the sportsman anxious to secure a large pair of tusks. But, whilst preserving the Elephant, it is necessary also to think of the people. Latterly, and as a practical result of protection, many complaints have been received of damage done to shambas and cultivation by Elephants, plantations being destroyed, and, in several instances, habitations and villages being deserted. The matter has been taken up, and temporary arrangements have been made by allowing, under certain well-defined conditions, Elephants actually found doing damage to plantations being killed, whereby it is hoped cultivation will be preserved with the least loss to the herds. At the same time, a few licences will be issued to the chiefs, allowing them to shoot two Elephants each under the game regulations on payment of the prescribed fee.

" As regards game generally, it finds a natural protection in the long grass, which obscures it from view for the greater part of the year in many portions of the Protectorate. Except when the grass is burnt, it is quite possible to march for many days and see little or no game, though it is well known to be in the neighbourhood."





1



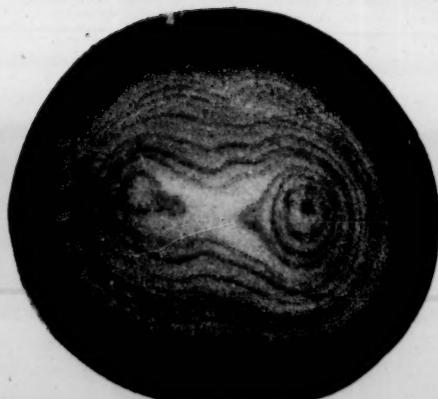
4



5



3



2

West, Newman photo.-proc.

SECTIONS OF PEARLS.